Application # 09/758,573
Submitted July 20, 2006
Reply to Office Action of January 20, 2006

III.   REMARKS/ARGUMENTS

4. The Office Action dated January 20, 2006 has been carefully considered.

Reconsideration of this application, in view of the following remarks, is respectfully requested.

A.   References

5. The following U.S. patents were considered in the office action:

- US Patent 6,592,629 ("Cullen"), filed November 13, 1997

- US Patent 5,696,940 ("Lin"), filed September 29, 1995

- US Patent 5,828,856 ("Bowes"), filed March 21, 1996

- US Patent 6,338,119 ("Anderson"), filed March 31, 1999

B.   Overview of Office Action

6. The office action:

a. rejected claims 1, 5-9, 11-18, 22, 23, 26, 27, 30-34 as being unpatentable over Lin in view of Bowes under 35 U.S.C. 103(a),

b. rejected claims 2-4 as being unpatentable over Lin in view of Bowes and in further view of Anderson under 35 U.S.C. 103(a), and

c. rejected claims 19-21, 24, 25, 28, 29 as being unpatentable over Lin in view of Bowes as applied to claim 16 above, and in further in view of Cullen under 35 U.S.C. 103(a).

C.   Conventional Structural Elements

7. The Office Action relies on combinations of Lin, Bowes, Anderson, and Cullen to provide teaching regarding many of the structural elements of the claimed methods, such I/O RAM, main memory buffers, CPU, cached memory, CPU caches, external caches, DMA circuitry, etc. Many of these structural elements were well known in the art (as discussed in the

Application # 09/758,573
Submitted July 20, 2006
Reply to Office Action of January 20, 2006

Background—Related Technology section of the specification and in reference to Figures 1A,

1B, 1C, 2A and 2B).

D.   Novel Functionality within Convention Structure

8. The present invention claims novel functionality with a number of convention

structures. In particular, image processing performance may be increased by explicitly copying a

an image existing in an I/O RAM into an extra second copy of said image in a buffer in memory

prior to performing CPU intensive operations on the data copied from said image.

9. As explained in the specification, starting in the section entitled "Processing Speed

Improvement–Fig 3A to 3C", in one embodiment of the present invention, a memory copy

function is used to explicitly copy the desired image data from an I/O RAM to a cacheable main

memory (i.e. an extra second copy) where it can be more efficiently processed. After the

processing is done, the processed image is then copied back to the display video RAM for

display on the video display. Further, "[t]his invention discovered that is was much more

efficient to write the decoded data to a memory buffer 300 instead of writing it directly to image

310 in I/O RAM 220 as each pixel is processed."

10. Aspects of the present invention are further described in reference to Figures 4, 5,

and 6.

E.   Extra Second Copy Not Obvious

11. As stated in the "Not Obvious" section starting on page 8 of the specification, "speed

improvement yielded by this invention was not obvious to one skilled in the art of computer

programming" because the making of an extra second copy of the data would have been

considered to be overhead and adverse to performance.

Page 8 of 13

Application # 09/758,573
Submitted July 20, 2006
Reply to Office Action of January 20, 2006

F. Claim Elements which Distinguish over the Prior Art Not Clearly Identified with Convincing Reasoning

12. Each of the independent claims as amended contain language which distinctly claim the invention with language which distinguish the novel functionality and benefits of the present invention over the structural elements identified in the prior art combinations cited by the office action. As discussed in the following sections, the office action has not identified where these novel features are taught or suggested by the cited prior art.

Claim 1

13. Claim 1 claims a "method of <u>increasing image processing performance</u> by <u>explicitly copying</u> a first instance of an image existing in an I/O RAM into <u>an extra second copy of said image in a buffer in memory</u> <u>prior to performing CPU intensive operations on the data copied from said image,</u> wherein the <u>CPU access is made directly to the extra second copy of the data</u> in memory and not to the first instance in said I/O RAM." (emphasis added).

14. The office action does not clearly show where the cited prior art teaches explicitly copying "an extra second copy" of a image that is already in I/O RAM, nor does it clearly show where the extra second copy is made by "explicitly copying ... prior to performing CPU intensive operations on the data copied" where "the CPU access is made directly to the extra second copy of the data in memory." Further the office action does not show where the prior art clearly teaches the discovery that taking the time and resources to make "an extra second copy" leads to the result of "increasing image procession performance" over convention methods. Thus the office action has not shown where subject matter of claim 1 as a whole, including its differences over the prior art, would have been obvious.

15. Note that claim 1 was amended to correct punctuation (adding a period).

<div align="center">Page 9 of 13</div>

Application # 09/758,573
Submitted July 20, 2006
Reply to Office Action of January 20, 2006

Claim 12

16. Claim 12 claims a "method of <u>increasing image processing performance</u> by <u>explicitly</u> <u>storing</u> the processed <u>results of CPU intensive operations</u> in a first instance of a buffer in memory <u>prior to copying the processed data into a distinct second copy of the processed data</u> in an image in an I/O RAM, wherein the <u>CPU results are written directly to the first instance of the processed data in memory</u> and <u>not to the distinct second copy in said I/O RAM</u>." (emphasis added).

17. The office action does not clearly show where the cited prior art teaches explicitly storing "a distinct second copy" of processed data after the results have already been processed, nor does it clearly show where "the CPU results are written directly to first instance...and not to the distinct second copy in said I/O RAM." Further the office action does not show where the prior art clearly teaches the discovery that taking the time and resources to make "a distinct second copy" leads to the result of "increasing image procession performance" over convention methods. Thus the office action has not shown where subject matter of claim 12 as a whole, including its differences over the prior art, would have been obvious.

Claim 16

18. Claim 16 claims a "machine for image processing...wherein said image data is copied from said I/O device <u>to a second copy</u> of said image data in a buffer in said memory <u>prior to being processed by said processor</u> or wherein said processor processes said image data using a buffer in said memory <u>before copying the processed image data from said memory to said I/O device</u>, whereby <u>image processing time is reduced</u>." (emphasis added).

Application # 09/758,573
Submitted July 20, 2006
Reply to Office Action of January 20, 2006

19. The office action does not clearly show where the cited prior art teaches explicitly copying "a second copy" of a image that is already in I/O RAM, nor does it clearly show where the extra second copy is made by "is copied...prior to being processed by said processor" or "said processor processes said image data using a buffer in said memory before copying the processed image data to said I/O device." Further the office action does not show where the prior art clearly teaches the discovery that taking the time and resources to make "a second copy" leads to the result where "image processing time is reduced" over convention methods. Thus the office action has not shown where subject matter of claim 16 as a whole, including its differences over the prior art, would have been obvious.

Claim 22

20. Claim 22 claims a "machine for image processing..." which includes "a means for copying said image data from said input device to a second copy of said image data in a buffer in said memory prior to being processed by said processor, whereby image processing time is reduced compared to the image processing time required if the processor processed the first copy of the image data in the input device." (emphasis added).

21. The office action does not clearly show where the cited prior art teaches a means for copying to "a second copy" of image data that is already in I/O RAM, nor does it clearly show where the extra second copy is made by "prior to being processed by said processor." Further the office action does not show where the prior art clearly teaches the discovery that taking the time and resources to make "a second copy" leads to the result where "image processing time is reduced compared to the image processing time required if the processor processed the first copy of the image data in the input device." Thus the office action has not shown where subject

matter of claim 22 as a whole, including its differences over the prior art, would have been obvious.

Claim 26

22. Claim 26 claims a "machine for image processing" including "a means for copying, after said processor generates a first set of image data in said memory, said first set of image data from said memory to a second copy of said image data in said output device, whereby image processing time is reduced compared to the image processing time required if the processor generated the image data directly in said input device instead of said memory." (emphasis added).

23. The office action does not clearly show where the cited prior art teaches a means for copying to "a second copy" of image data that is already in I/O RAM, nor does it clearly show where the extra second copy is made by "prior to being processed by said processor." Further the office action does not show where the prior art clearly teaches the discovery that taking the time and resources to make "a second copy" leads to the result where "image processing time is reduced compared to the image processing time required if the processor processed the first copy of the image data in the input device." Thus the office action has not shown where subject matter of claim 26 as a whole, including its differences over the prior art, would have been obvious.

G.   Dependent Claims At Least Allowable

24. Applicant submits that the independent claims may all be distinguished over the cited prior art as discussed above. Further all of the dependent claims would be allowable for at least the same reasons that the claims upon which they depend are allowable. Further, at least
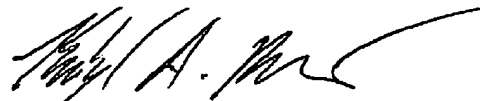
Application # 09/758,573
Submitted July 20, 2006
Reply to Office Action of January 20, 2006

some of the dependent claims included novel features, such as various ways in which the

memcopy function is used which results in further improvements to the image processing

performance than was unexpected by the prior art.

H.   Reconsideration Requested

25. The undersigned respectfully submits that, in view of the foregoing remarks, the

rejections of the claims raised in the Office Action have been fully addressed and overcome, and

the present application is believed to be in condition for allowance. It is respectfully requested

that this application be reconsidered, that these claims be allowed, and that this case be passed to

issue. If it is believed that a telephone conversation would expedite the prosecution of the

present application, or clarify matters with regard to its allowance, the Examiner is invited to call

the undersigned inventor at 408-739-9517.

Respectfully submitted,

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Date: July 20, 2006

Page 13 of 13